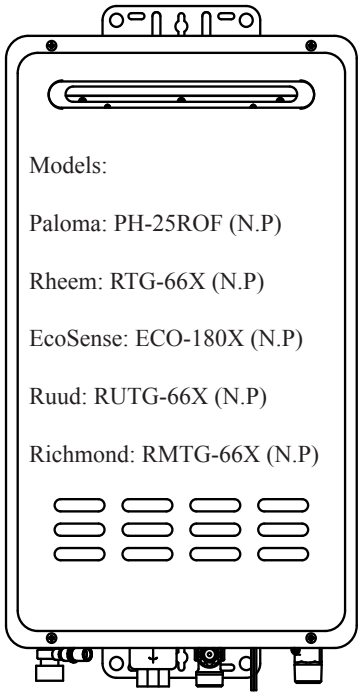
Use & Care Manual
With Installation Instructions for the Installer

Outdoor Gas

Tankless Water Heater

⚠Warning: This water heater is not suitable for use in manufactured (mobile) homes!



Models:

Paloma: PH-25ROF (N.P)

Rheem: RTG-66X (N.P)

EcoSense: ECO-180X (N.P)

Ruud: RUTG-66X (N.P)

Richmond: RMTG-66X (N.P)

The purpose of this manual is twofold: one, to provide the installer with the basic directions and recommendations for the proper installation and adjustment of the water heater; and two, to the owner–operator, to explain the features, operation, safety precautions, maintenance and troubleshooting of the water heater. This manual also includes a parts list.

It is very important that all persons who are expected to install, operate or adjust this water heater read the instructions carefully so they may understand how to perform these operations. If you don't understand these instructions or any terms within it, seek professional assistance.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the seller from whom it was purchased. If additional information is required, refer to the section on If You Need Service.

Do not destroy this manual. Please read carefully and keep in a safe place for future reference.

⚠ Recognize this symbol as an indication of Important Safety Information!

⚠ California Proposition 65 Warning: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

⚠ WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

⚠ FOR YOUR SAFETY!

— Do not store or use gasoline or other flammable vapors or liquids or other combustible materials in the vicinity of this or any other appliance. To do so may result in an explosion or fire.

— WHAT TO DO IF YOU SMELL GAS

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**
- **Do not return to your home until authorized by the gas supplier or fire department.**

— Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death. Refer to this manual. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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Printed in Japan

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FOR YOUR RECORDS

Write the model and serial numbers here:

#_____

#_____

You can find them on a label on the appliance.

Staple sales slip or cancelled check here.

Proof of the original purchase date is needed to obtain service under the warranty.

READ THIS MANUAL

Inside you will find many helpful hints on how to use and maintain your water heater properly. A little preventive care on your part can save you time and money over the life of your water heater.

You'll find many answers to common problems in the Troubleshooting Guide. If you review the chart of Troubleshooting Tips first, you may not need to call for service.

READ THE SAFETY INFORMATION

Your safety and the safety of others are very important. There are many important safety messages in this manual and on your appliance. Always read and obey all safety messages.

This is the safety alert symbol. Recognize this symbol as an indication of Important Safety Information! This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER", "WARNING", "CAUTION" or "NOTICE".

These words mean:

⚠ DANGER	**An imminently hazardous situation that will result in death or serious injury.**
⚠ WARNING	**A potentially hazardous situation that could result in death or serious injury and/or damage to property.**
⚠ CAUTION	**A potentially hazardous situation that may result in minor or moderate injury.**
Notice:	**Attention is called to observe a specified procedure or maintain a specific condition.**

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IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

Be sure to read and understand the entire Use and Care Manual before attempting to install or operate this water heater. It may save you time and money. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious bodily injury or death. Should you have problems understanding the instructions in this manual, or have any questions, STOP, and get help from a qualified service technician, or the local gas utility.

⚠DANGER!

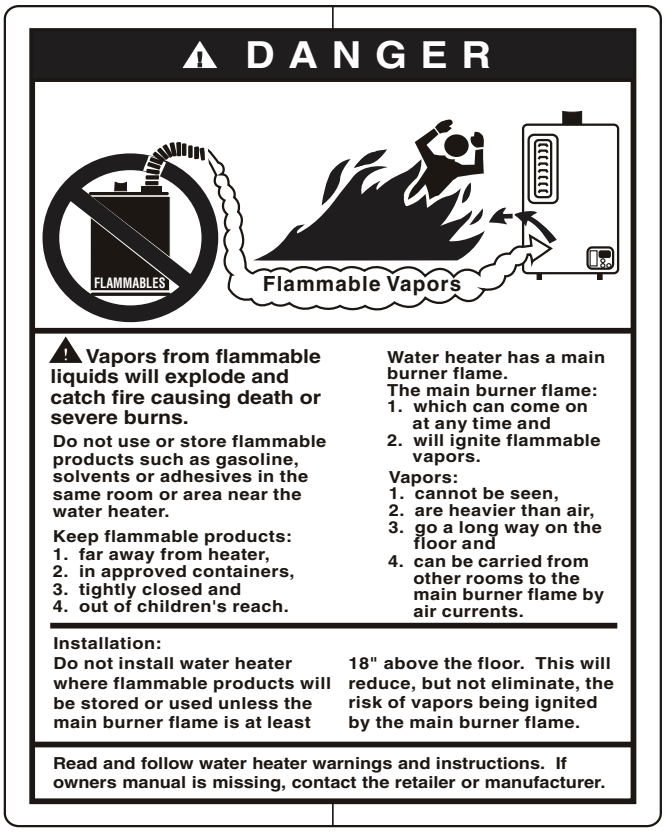
INSTALL AND PROPERLY VENT THE WATER HEATER...

Failure to install and properly vent the water heater to the outdoors as outlined in the Venting Section of the Installation Instructions in this manual can result in unsafe operation of the water heater. To avoid the risk of fire, explosion or asphyxiation from carbon monoxide, never operate this water heater unless it is properly vented and has an adequate air supply for proper operation.

Be sure to inspect the vent outlet for proper installation at initial start-up; and at least annually thereafter. Refer to the Care and Cleaning section of this manual for more information regarding vent system inspection.

⚠WARNING!

Gasoline, as well as other flammable materials and liquids (which include, but are not limited to adhesives, solvents, paint thinners etc.), and the vapors they produce are extremely dangerous. DO NOT handle, use or store gasoline or other flammable or combustible materials anywhere near or in the vicinity of a water heater or any other appliance. Be sure to read and follow the labels on the water heater, as well as the warnings printed in this manual. Failure to do so can result in property damage, bodily injury or death.


⚠ DANGER
FLAMMABLES
Flammable Vapors
⚠ Vapors from flammable liquids will explode and catch fire causing death or severe burns.
Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.
Keep flammable products:
1. far away from heater,
2. in approved containers,
3. tightly closed and
4. out of children's reach.
Water heater has a main burner flame.
The main burner flame:
1. which can come on at any time and
2. will ignite flammable vapors.
Vapors:
1. cannot be seen,
2. are heavier than air,
3. go a long way on the floor and
4. can be carried from other rooms to the main burner flame by air currents.
Installation:
Do not install water heater where flammable products will be stored or used unless the main burner flame is at least 18" above the floor. This will reduce, but not eliminate, the risk of vapors being ignited by the main burner flame.
Read and follow water heater warnings and instructions. If owners manual is missing, contact the retailer or manufacturer.

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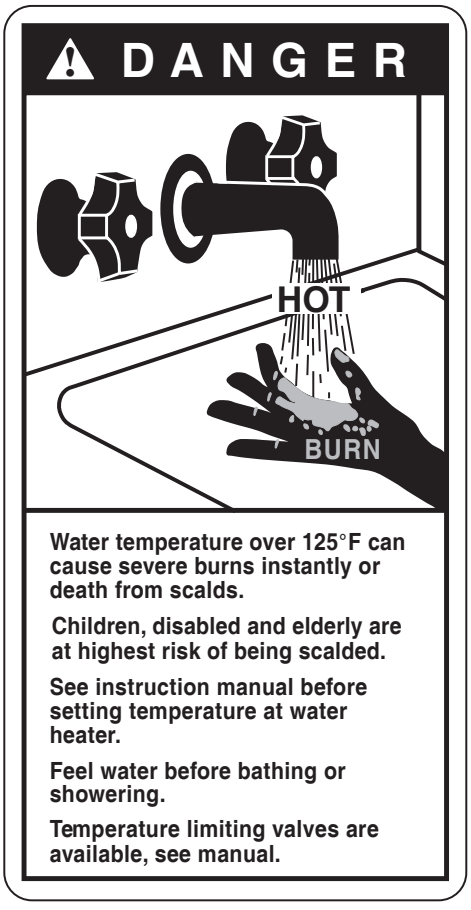
IMPORTANT SAFETY INFORMATION
READ ALL INSTRUCTIONS BEFORE USING.

⚠DANGER!

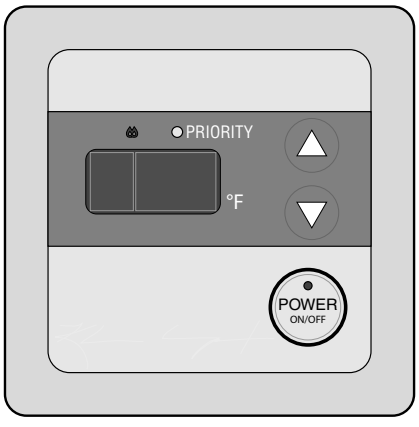
WATER TEMPERATURE SETTING

Safety and energy conservation are factors to be considered when selecting the water temperature setting of a water heater's remote control. Water temperatures above 125°F (52°C) can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured below.



Notice:

Display shows °F only.



Higher (Hotter) Lower (Cooler)

| | | |

DANGER!

NATURAL GAS AND LIQUEFIED PETROLEUM MODELS

Both LP and natural gas have an odorant added to aid in detecting a gas leak. Some people may not physically be able to smell or recognize this odorant. If you are unsure or unfamiliar with the smell of LP or natural gas, ask the gas supplier. Other conditions, such as "odorant fade", which causes the odorant to diminish in intensity, can also hide or camouflage a gas leak.

- **Water heaters utilizing LP gas are different from natural gas models. A natural gas water heater will not function safely on LP gas and vice versa.**
- **No attempt should ever be made to convert the water heater from natural gas to LP gas. To avoid possible equipment damage, personal injury or fire, do not connect the water heater to a fuel type not in accordance with the unit data plate; propane for propane units and natural gas for natural gas units. These units are not certified for any other fuel type.**
- **LP appliances should not be installed below grade (for example, in a basement) if such installation is prohibited by federal, state and/or local laws, rules, regulations or customs.**
- **Propane or LP gas must be used with great caution. It is heavier than air and will collect first in lower areas, making it hard to detect at nose level.**
- **Before attempting to light the water heater, make sure to look and smell for gas leaks. Use a soapy solution to check all gas fittings and connections. Bubbling at a connection indicates a leak that must be corrected. When smelling to detect a gas leak, be sure to sniff near the floor also.**
- **Gas detectors are recommended in LP and natural gas applications and their installation should be in accordance with the detector manufacturer's recommendations and/or local laws, rules, regulations or customs.**
- **It is recommended that more than one method, such as soapy solution, gas detectors, etc., be used to detect leaks in gas applications.**

Notice: If a gas leak is present or suspected:

- ***Do not*** **attempt to find the cause yourself.**
- ***Do not*** **try to light any appliance.**
- ***Do not*** **touch any electrical switch.**
- ***Do not*** **use any phone in your building.**
- **Leave the building immediately and make sure your family and pets leave also.**
- **Leave the doors open for ventilation and contact the gas supplier, a qualified service agency or the fire department.**
- **Stay away from the building until the service call has been made, the leak is corrected and a qualified agency has determined the area to be safe.**

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IMPORTANT SAFETY INFORMATION
READ ALL INSTRUCTIONS BEFORE USING.

⚠ WARNING!

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion, electric shock, or to prevent property damage, personal injury or loss of life.

FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that water heaters must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For water heaters up to 52 gallon capacity, a brochure with generic earthquake bracing instructions can be obtained from: Office of the State Architect, 1102 Q Street, Suite 5100, Sacramento, CA 95814 or you may call 916-445-8100 or ask a water heater dealer.

However, applicable local codes shall govern installation. For residential water heaters of a capacity greater than 52 gallons or tankless-style, consult the local building jurisdiction code for acceptable bracing procedures.

SAFETY PRECAUTIONS

Have the installer show you the location of the gas shut-off valve and how to shut it off if necessary. Turn off the manual shut-off valve if the water heater has been subjected to overheating, fire, flood, physical damage or if the gas supply fails to shut off.

- **Read this manual entirely before installing or operating the water heater.**
- **Use this appliance only for its intended purpose as described in this Use and Care Manual.**
- **Be sure your appliance is properly installed in accordance with local codes and the provided installation instructions.**
- **Do not attempt to repair or replace any part of your water heater unless it is specifically recommended in this manual. All other servicing should be referred to a qualified technician.**

READ AND FOLLOW THIS SAFETY INFORMATION CAREFULLY.

SAVE THESE INSTRUCTIONS

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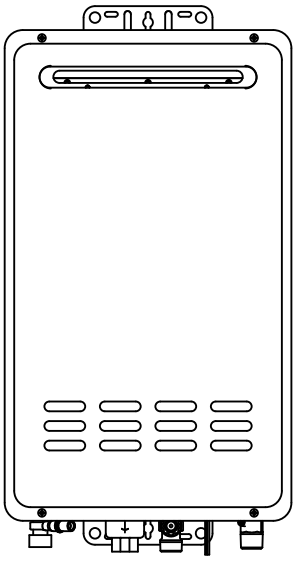
Installing the water heater:

This water heater must be installed in accordance with these instructions, local codes, utility company requirements and/or in the absence of local codes, use the latest edition of the American National Standard/ National Fuel Gas Code. A copy can be purchased from either the American Gas Association, 400 North Capitol Street Northwest, Washington, DC 20001 as ANSI standard Z223.1 or National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269 as NFPA 54. In Canada, the latest edition of the CSA B149.1 Natural Gas and Propane Installation, and the Canadian Electrical Code, CSA C22.1 Part 1, in the absence of local codes.



Location of the water heater

This water heater is for OUTDOOR installation ONLY!

<u>This water heater is an outdoor model and must be mounted vertically. It must not be installed indoors or in a confined space.</u>

The water heater should be installed close to the most frequently used outlet and its position chosen with safety and service in mind.

Make sure people (particular children, disabled, and elderly) will not touch the hot water outlet or the flue terminal. The flue terminal and air inlet must be clear of obstruction and shrubbery.

The water heater should not be located in an area where leakage of the heat exchanger or connections will result in damage to the area adjacent to it or to lower floors of the structure.

A gas fired water heater or any other appliance should not be installed in a space where liquids which give off flammable vapors are to be used or stored. Such liquids include gasoline, but are not limited to, LP gas (butane or propane), paint or adhesives and their thinners, solvents or removers.

Because of natural air movement in a room or other enclosed space, flammable vapors can be carried some distance from where their liquids are being used or stored. The open flame of the water heater's main burner can ignite these vapors, causing an explosion or fire which may result in severe burns, death or property damage.

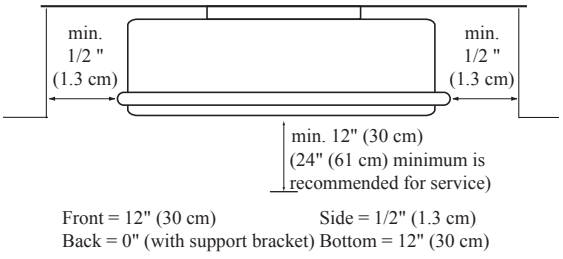
The water heater must be located so it is not subject to physical damage, for example, by moving vehicles, area flooding, etc.

- The water heater should be installed vertically with the water, gas and power connections on the underside pointing toward the ground.
- Failure to properly install the water heater outdoors as outlined in this manual can result in unsafe operation.
- Hot and cold water lines should be insulated to conserve water and energy.
- The water heater and water lines should be protected from exposure to freezing temperatures.
- **Do not** install water heater where subject to vibrations.
- **Do not** install the water heater in Recreational Vehicles, Mobile Homes, Boats and other Watercrafts.
- **Do not** install the water heater near vents for heating or cooling. A minimum of 4 feet should be maintained.
- Minimum clearance from combustible and noncombustible construction is 1/2" (1.3 cm) sides, 0" rear (with support bracket); 12" (30 cm) from the bottom; 12" (30 cm) from the front of the water heater; (24" [61 cm] from front recommended for servicing purposes). If the clearances stated on the Instruction/ Warning Label, located on the front panel of the heater differ, install the water heater according to the clearances stated on the label.

⚠WARNING: Combustible construction refers to adjacent walls and ceilings and should not be confused with combustible or flammable products and materials. Combustible and/or flammable products and materials should never be stored in the vicinity of this or any gas appliance.

⚠CAUTION:
Protect plastic, paint or other items sensitive to heat using non-combustible insulation if these are exposed to the flue exhaust even though they may be more than 24" (61 cm) away from the water heater.

Minimum Clearance from Combustible and Non-Combustible Construction.



Front = 12" (30 cm) Side = 1/2" (1.3 cm)
Back = 0" (with support bracket) Bottom = 12" (30 cm)

Top: Do not install this water heater under an overhang less than 36" (91 cm) from its top. The area under the overhang must be open on 3 sides.

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Installing the water heater:

Proper operation of the water heater requires air for combustion and ventilation. Provisions for combustion and ventilation air must comply with referenced codes and standards.

Combustion and Ventilation Air

This water heater is for OUTDOOR installation ONLY.

⚠DANGER: It must NOT be installed indoors or in a confined space.

NOTICE: The water heater should not be installed near an air supply containing halogenated hydrocarbons.

Corrosive Atmospheres

The air in beauty shops, dry cleaning establishments, photo processing labs, and storage areas for liquid and powdered bleaches or swimming pool chemicals often contains such halogenated hydrocarbons.

An air supply containing halogenated hydrocarbons may be safe to breathe, but when it passes through a gas flame, corrosive elements are released that will shorten the life of any gas burning appliance.

Propellants from common spray cans or gas leaks from A/C and refrigeration equipment are highly corrosive after passing through a flame.

The water heater warranty is voided when failure of the heater is due to operation in a corrosive atmosphere.

Inspect Shipment

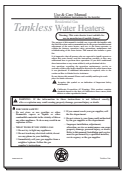
Inspect the water heater for possible damage. Check the markings on the rating plate of the water heater to be certain the type of gas supplied corresponds to the water heater requirements. Verify all included parts are present (see below).

Remote Control Assembly Kit

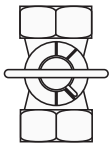
Wood Screw x 5pcs.

Washer x 4 pcs.

Warranty



Use & Care Manual



Manual Appliance Gas Shut-off Valve

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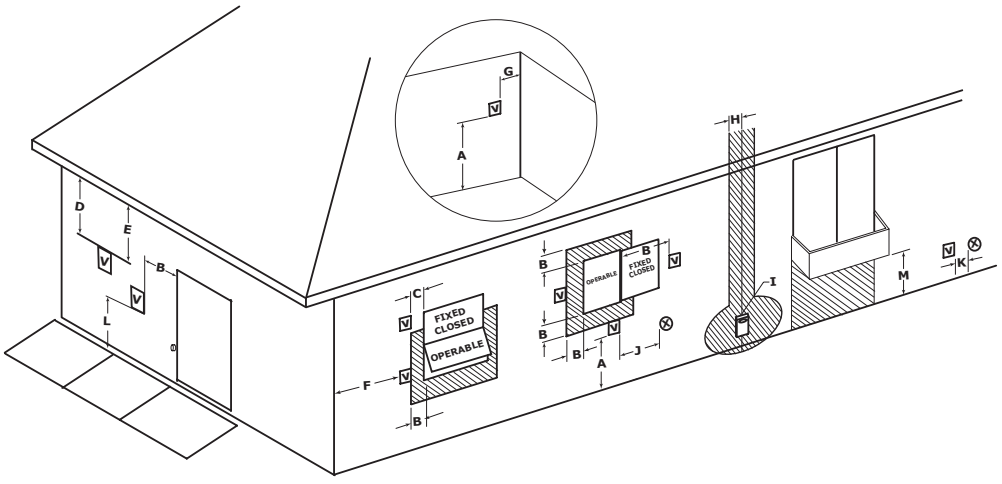

V VENT TERMINAL ⓧ AIR SUPPLY INLET AREA WHERE TERMINAL IS NOT PERMITTED

Horizontal Vent Terminal Location

The following information should be used for determining the proper location of the vent terminal for indoor and outdoor tankless water heaters.

	Canadian Installations [1] Outdoor	US Installations [2] Outdoor
A= Clearance above grade, veranda, porch, deck or balcony.	12 inches (30 cm) above anticipated snow level.	12 inches (30 cm) above anticipated snow level.
B= Clearance to window or door that may be opened.	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 12 inches (30 cm) for appliances > 10,000 Btuh (3kW) and ≤ 100,000 Btuh (30kW), 36 inches (91 cm) for appliances > 100,000 Btuh (30kW).	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3kW) and ≤ 50,000 Btuh (15kW), 12 inches (30 cm) for appliances > 50,000 Btuh (15kW).
C= Clearance to permanently closed window.	*	*
D= Vertical Clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal.	*	*
E= Clearance to unventilated soffit.	*	*
F= Clearance to outside corner.	*	*
G= Clearance to corner.	*	*
H = Clearance to each side of center line extended meter/regulator assembly. above	3 feet (91 cm) within a height 15 feet (4.57 m) above the meter/regulator assembly.	*
I = Clearance to service regulator vent outlet.	3 feet (91 cm)	*
J = Clearance to nonmechanical air supply inlet to the combustion air inlet to any building or other appliance.	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 12 inches (30 cm) for appliances > 10,000 Btuh (3kW) and ≤ 100,000 Btuh (30kW), 36 inches (91 cm) for appliances > 100,000 Btuh (30kW).	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3kW) and ≤ 50,000 Btuh (15kW), 12 inches (30 cm) for appliances > 50,000 Btuh (15kW).
K = Clearance to mechanical air supply inlet.	6 feet (1.83 m)	3 feet (91 cm) above if within 10 feet (3 m) horizontally.
L = Clearance above paved sidewalk or paved driveway located on public property.	7 feet (2.13m) †	*
M = Clearance under veranda, porch, deck or balcony.	Not Allowed	Not Allowed

1 In accordance with current CSA-B149.1 Installation Codes.
2 In accordance with current ANSI Z223.1/ NFPA 54 National Fuel Gas Code.

† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

* For clearances not specified in ANSI 223.1/NFPA 54 or CSA-B149.12, one of the following shall be indicated:
a) A minmum clearance value determined by testing in accordance with section 2.20, or;
b) A reference to the following footnote: "Clearance in accordance with local installtion codes and the requirements of the gas supplier."

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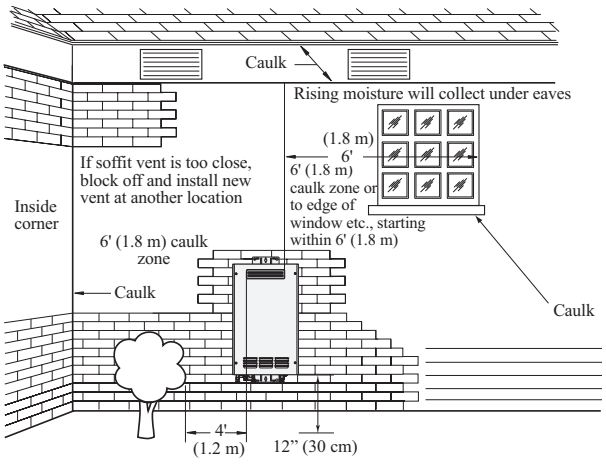
Installing the water heater:

Outdoor Water Heater



⚠WARNING: Moisture in the flue gas will condense as it leaves the vent terminal. In cold weather this condensate can freeze on the exterior wall, under the eaves and on surrounding objects. Some discoloration on the exterior of the building is to be expected. However, improper location or installation can result in severe damage to the structure or exterior finish of the building.

Additional Considerations

1. Do NOT install vent terminal under any patio or deck.
2. To help prevent moisture from freezing on walls and under eaves, do not locate vent terminal on the side of a building with prevailing winter winds.
3. To help prevent water lines from freezing, do not locate vent terminal on the side of a building with prevailing winter winds.
4. Do NOT locate vent terminal too close to shrubbery, as flue gases may damage them.
5. All painted surfaces should be primed to lessen the chance of physical damage. Painted surfaces will require maintenance.
6. Guard vent against accidental contact with people and pets.
7. Install outdoor water heater such that air inlet and flue outlet is above anticipated snow level.

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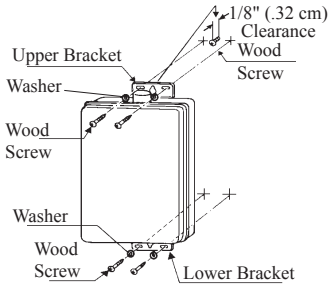
Installing the water heater:

Mounting the Water Heater

⚠CAUTION:
Reinforcement of the wall is required in case the wall is not strong enough to hold the appliance.



Make sure the location of the appliance allows for easy access and operation.

Wall studs should be utilized when mounting the water heater to the wall. Alternately, a suitable piece of wood may be placed inside or outside of the wall to span the distance between the wall studs. Fasten the water heater mounting brackets to the wood.

In case of dry wall or concrete wall, use drywall anchors or lag bolts.

The water heater requires 120VAC/60Hz. Have a receptacle with ground terminal near the water heater. A power supply cord is not supplied with the water heater. Install a wood screw for the upper bracket with a clearance of 1/8" (.32 cm) between the wall and the screw head. Hang the center of the upper bracket on the screw.

Using a wood screw and a washer, affix the lower bracket to the wall (Left and Right). Repeat to affix the top bracket.

Thermal Expansion

A thermal expansion tank will be required if the water heater is installed in a closed loop system to prevent damage to heater, related piping and relief valve. Replacing the relief valve will not correct the problem! The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the over pressure condition and eliminating the repeated operation of the relief valve. Other methods of controlling thermal expansion are also available. Contact your installing contractor, water supplier or plumbing inspector for additional information regarding this subject.

Water Supply Connections

IMPORTANT: Do not apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the water connections on heater. Any heat applied to the water supply fittings will permanently damage the internal components of the water heater.

Notice: Due to cold environments, ice may potentially accumulate at the water connections. In this case, please insert the power cord of the water heater into an electrical outlet. The ice should melt within approximately 10 minutes and at this time the water connections can be made.

Plumbing should be carried out by a qualified plumber in accordance with local codes.

Use approved plumbing materials only.

The diameter of the pipe lines should be a minimum of 3/4".

To conserve energy and to prevent freezing, insulate both cold and hot water supply lines. DO NOT cover the drain or pressure relief valve.

To ensure proper operation of the water heater, the following water pressure guidelines should be followed:

- Operation of the water heater requires the minimum water pressure of 14 psi (97 kPa) and a minimum water flow rate of 0.66 gpm (2.5 lpm).
- A water pressure of 40 psi (276 kPa) is required to achieve maximum flow rate.
- To maintain proper performance, ensure sufficient water supply pressure. The Required Water Pressure = Min. Operating Water Pressure (14 psi [97 kPa]) + Pipe Pressure Loss + Faucet and Shower Pressure Loss + Safety Margin (more than 5 psi [34 kPa]).
- To supply hot water to upper floors, additional water pressure (0.44 psi/ft [10 kPa/m]) must be ensured. The measurement should be calculated by the distance between the water inlet of the water heater (ground level) to the hot water faucet (upper floor level).
- Well water systems should be set to ensure a minimum system pressure of 40 psi (276 kPa). The pressure should remain stable during the operation of the water heater.
- When the water is supplied from a water supply tank, the height of the tank and the diameter of the pipes and their relation to water pressure should be taken into consideration. **Gravity water pressure is not recommended**.

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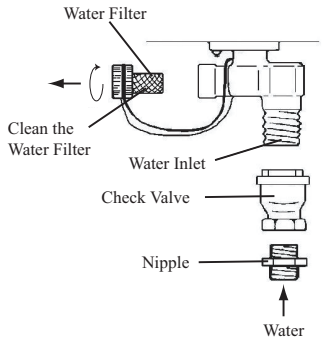
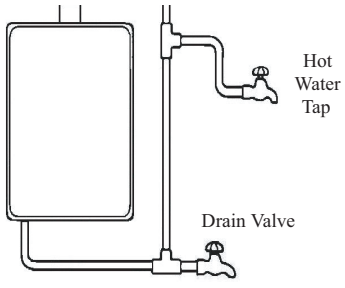
Water Supply Connections, continued

⚠CAUTION: This water heater must only be used with the following water supply system conditions:

- **With clean, potable water free of corrosive chemicals, sand, dirt or other contaminates.**
- **With inlet water temperatures above 32°F (0°C), but not exceeding 120°F (49°C).**
- **Free of lime and scale deposits.**
- **DO NOT reverse the hot and cold water connections. The water heater will not operate.**



Notice: Use only teflon tape on cold and hot water connections and lines.



This appliance is not intended for space heating application. Do not connect this heater to waterlines previously used for space heating or non-potable water distribution. All water piping and components shall be suitable for potable water.

Notice: If the water flow resistance of a shower head is too high, the burner in the water heater will fail to ignite. Keep the shower head clean from debris that could cause additional pressure drop.

Notice: If using mixing valves on the outlet, choose one that prevents cold water pressure from overcoming hot water line pressure.

Notice: If multiple water heaters are installed in a manifold system, the water piping must be in "Parallel". A water pressure of 40 psi (276 kPa) is recommended for each water heater for proper operation of the water heaters.

Alternate Water Piping Arrangement with Optional Valve Kit

Valve kits may be purchased and installed as optional items. Contact your distributor or place of purchase for details.They allow for one person full diagnostic testing and ease of flushing the system. The kit includes two full port isolation valves, one for the cold side and one for the hot side. Refer to page 18.

Install a shutoff valve near the inlet of the water heater for service and draining purposes.

It is not recommended to use pipes with smaller diameters than the water supply connection of the water heater.

Before connecting the water supply pipe to the water heater, open the shutoff valve and clean out sand, debris, air, caulking material, etc. inside the pipe. Connect to the water inlet, then check water flow. Close the shutoff valve and clean the water filter.

Be sure to connect the water inlet and the hot water outlet as shown on the water heater. If reversed, the water heater will not function.

Installation of unions or flexible copper connections are recommended on the HOT and COLD water lines, so that the water heater may disconnect easily for servicing, if necessary.

Install a Check Valve between the water heater and the water shutoff valve (see the top left diagram).

The following should be addressed in regards to the HOT WATER OUTLET:

- Connections between the water heater and point(s) of use should be as short and direct as possible.
- Local codes shall govern the exact type of pipe material that is to be used for water connections.
- To conserve energy and minimize heat loss, insulation of hot water piping is recommended (see Hot and Cold Pipe Insulation Installation on page 19).

Notice: The flow rate of hot water may vary when more than two faucets (appliances, fixtures, etc.) are being used simultaneously.

Notice: The pipes MUST be completely drainable. If the hot water faucets are located at a point higher than the water heater, place a drain valve at the lowest point (see diagram at the left).

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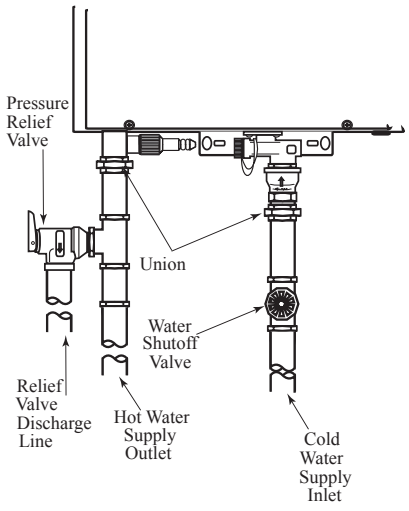
Installing the water heater:



Notice: The above illustrates a pressure-only relief valve. If local codes require a combination temperature and pressure relief valve be installed, an extension piece may be needed to ensure that the valve probe is not directly in the flow path of the water.

Relief Valve

A new pressure relief valve, complying with the Standard for Relief Valves and Automatic Gas Shut-Off Devices for Hot Water Supply Systems, ANSI Z21.22/ CSA 4.4, must be installed at the hot water outlet connection of the water heater at the time of installation. Local codes shall govern the installation of relief valves.

For safe operation of the water heater, be sure that:

- The pressure rating of the relief valve must not exceed 150 psi (1034 kPa), the maximum working pressure of the water heater as marked on the rating plate.
- The BTUH rating of the relief valve must equal or exceed the BTUH input of the water heater as marked on its rating plate.
- No valve of any type should be installed between the relief valve and the water heater
- Discharge from the relief valve should be piped to a suitable drain to eliminate potential water damage. Piping used should be of a type approved for the distribution of hot water.
- Hot and cold water lines should be insulated up to the water heater. Refer to page 19 for details.
- The discharge line must be NO SMALLER than the outlet of the relief valve and must pitch downward to allow complete drainage (by gravity) of the relief valve and discharge line.
- The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line.

Notice: Local codes govern the installation of relief valves. If local codes require that a temperature and pressure relief valve should be installed, the manufacturer recommends a type 40XL Watts T&P relief valve or an equivalent model be used.

Notice: Manual operation of relief valves should be performed at least once a year. Turn off the electrical power and gas shutoff valve. Lift and release lever on the relief valve and check the manual operation of the relief valve. You should take precaution to avoid contact with the hot water coming out of the relief valve and to prevent water damage.

Notice: If the relief valve on the system discharges periodically, a problem exists and service to the water system is required.

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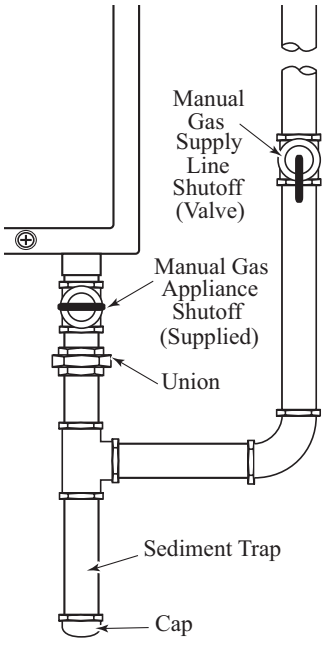
⚠WARNING: Do not attempt to convert this water heater for use with a different type of gas other than the type shown on the rating plate. Such conversion could result in hazardous operating conditions.

Gas Supply



The supplied Manual Gas Appliance Shutoff Valve must be installed at the gas connection of the water heater at the time of installation (see diagram to the left).

The branch gas supply line to the water heater should be a minimum of 3/4" black steel pipe or other approved gas piping material.

A ground joint union or ANSI design certified semi-rigid or flexible gas appliance connector should be installed in the gas line close to the water heater. The National Fuel Gas Code (NFGC) ANSI Z223.1 and CAN B149 code mandates a manual gas shut-off valve: See NFGC & B149 for complete instructions.

If flexible connectors are used, the maximum length shall not exceed 36" (91 cm).

If lever type gas shut offs are used, they shall be T-Handle type.

Compound used on the threaded joints of the gas piping must be of the type resistant to the action of LP gas. Use compound sparingly on male threads only.

A sediment trap should be installed at the bottom of the gas line.

Do not use excessive force (over 31.5 ft lbs. [42.7 Nm]) in tightening the pipe, particularly if teflon pipe compound is used, as the unit may be damaged.

The inlet gas pressure to the water heater must not exceed 10.5" w.c. (2.6 kPa) for natural or 13" w.c. (3.2 kPa) for LP gas. For purposes of input adjustment, the minimum inlet gas pressure (with main burner on) is shown on the water heater rating plate. If high or low gas pressures are present, contact your gas supplier for correction.

NOTICE: To ensure proper operation of the heater the gas pipe and gas meter must be sized correctly.

Gas piping shall be in accordance with local, utility company requirement and/or in the absence of local codes, use the latest edition of the National Fuel Gas Code. In Canada, the latest edition of CSA B149.1 Natural Gas and Propane installation code.

⚠WARNING: Never use an open flame to test for gas leaks, as property damage, personal injury, or death could result.

Leak Testing

The water heater and its gas connections must be leak tested at normal operating pressures before it is placed in operation.

1. Turn on the gas shut-off valve(s) to the water heater.
2. Use a soapy water solution to test for leaks at all connections and fittings. Bubbles indicate a gas leak that must be corrected.

The factory connections should also be leak tested after the water heater is placed in operation.

⚠WARNING: Install a gas pressure regulator, in the gas supply line, which does not exceed the maximum supply pressure.

DO NOT use an industrial type gas regulator.

Pressure Testing the Gas Supply System

The water heater and its manual gas shut-off valve must be disconnected from the gas supply piping system during any pressure testing of the system at pressures in excess of 1/2 psi (14" w.c. [3.5 kPa]).

The water heater must be isolated from the gas piping system by closing the manual gas shut-off valve during any pressure testing of the gas supply piping at pressures equal to or less than 1/2 psi (14" w.c. [3.5 kPa]).

High Altitude

This water heater is certified for installations up to 3,280 feet (1000 m) above sea level. The input rating of this water heater is based on sea level operation. At higher elevations, the actual input rate may be lower than the value listed on the rating label.

NOTICE: LP gas models are only certified for installations up to 3,280 feet (1000 m) above sea level.

NOTICE: For installations above 3,280 feet (1,000 m) elevation, contact a quailified service technician to make the proper altitude adjustment. See page 31 for additional information.

Do not install this water heater at elevations above 3,280 feet (1,000 m) without making the proper adjustment. Please contact your installer, local gas supplier, place of purchase or the Customer Service phone number as listed in this Use & Care Manual for more information.

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Installing the Main Remote Control:

⚠WARNING: Field wiring connections and electrical grounding must comply with local codes, or in the absence of local codes, with the latest edition of the National Electrical Code, ANSI/NFPA 70, or in Canada, Canadian Electrical Code, CSA C22.1 Part 1.

NOTICE: The provided remote control will allow a maximum temperature setting of 120°F (49°C). Temperatures of up to 140°F (60°C) for residential products and up to 185° F (85° C) for commercial products can be achieved with the MAIN (UMC-117) remote control. Only qualified service personnel should perform this adjustment.

NOTICE: An optional cable (EZ Link Cable™) can be purchased separately to manifold two heaters together.

Remote Control Installation

One (1) remote control is provided with the water heater. Additional remote controls may be purchased separately. Up to three (3) remote controls can be used with this water heater.

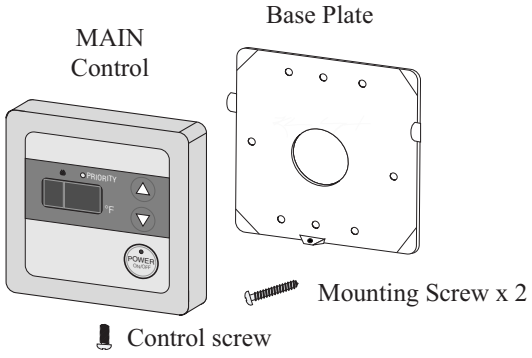
The following are considerations for determining the location of the remote control(s):

- **DO NOT** install any remote control outdoors or in areas where it can come in contact with water.
- Place remote control out of children's reach.
- The remote control can be installed in convenient locations such as the kitchen, laundry room, utility room, or directly beside the indoor water heater.
- Avoid areas where the remote control may be exposed to heat, e.g. ranges or heaters.
- Avoid areas where the remote control may be subjected to oil and/or steam from cooking.
- Avoid areas where chemical agents (such as thinner, benzine and alkalines) are used.
- Avoid areas of direct sunlight.
- The MAXIMUM distance between the water heater and the remote control installation location is limited to 195 feet (59 m) of wire.

NOTICE: Only one of each type of remote controls can connect to the water heater. Therefore, a maximum of three controls can connect to the water heater.

No other manufacturer's controls are suitable for use with this water heater.

DO NOT attempt to disassemble the remote control.



NOTICE: If a manifold system is installed, the main remote control connected to the manifold controller (MIC-180) has priority over the remote controls connected to the water heater.

NOTICE: A commercial conversion kit can be purchased separately to achieve temperatures up to 185° F (85° C).

Remote Control Model Number	Remote Control Description	Temperature Set Point Range	Availability
USC1-117	BATH 1	100°F–120°F (38°C)–(49°C)	Optional (Sold Separately)
		85°F (29°C)	Qualified Technician Adjustment
USC2-117	BATH 2	100°F–120°F (38°C)–(49°C)	Optional (Sold Separately)
		85°F (29°C)	Qualified Technician Adjustment
UMC-117	MAIN	100°F–120°F (38°C)–(49°C)	Factory Default
		85°F (29°C) 125°F–140°F (52°C)–(60°C)	Qualified Technician Adjustment for Residential Products
		85°F (29°C) 125°F–185°F (52°C)–(85°C)	Qualified Technician Adjustment for Commercial Products
MIC-180 Manifold System	Manifold System		Optional (Sold Separately)

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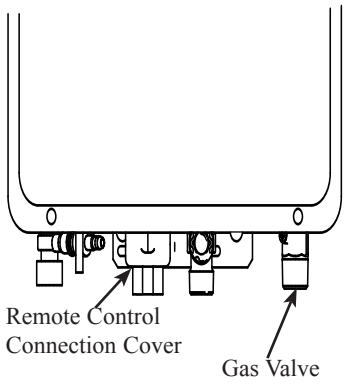
⚠WARNING: Field wiring connections and electrical grounding must comply with local codes, or in the absence of local codes, with the latest edition of the National Electrical Code, ANSI/NFPA 70, or in Canada, Canadian Electrical Code, CSA C22.1 Part 1.

Remote Control Installation

NOTICE: Extension cable can be any Type-T 18 AWG wire similar to a thermostat wire and need not be polarity sensitive.

Do Not apply sealant to the remote control cable.

It is not recommended to have wiring exposed.



Connecting the MAIN (UMC-117) remote control to the water heater:

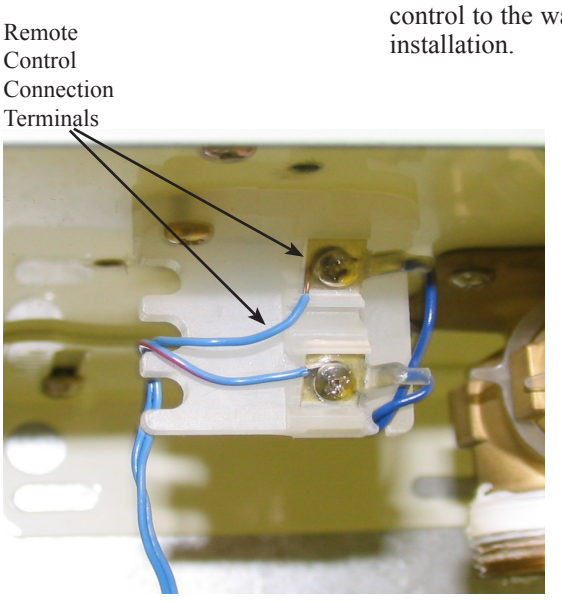
- Drill a 1" (2.5 cm) to 1-1/2" (3.8 cm) hole at the proposed control location.
- Install the extension cable between the location of the remote control and the water heater.
- Remove the base plate from the control.
- Feed the remote control extension cable through the central hole in the base plate.
- Fix the base plate to the wall using suitable screws and wall anchors. Ensure the projections on the base plate are pointing upward.
- Connect the remote control cables to the extension cable from the water heater.
- Place the remote control over the base plate. Ensure the projections in the base plate fit into the housings in the remote control.
- Fix the control to the base plate at the bottom of the remote control using the screw provided.
- Proceed to "Connecting the remote control to the water heater", to complete installation.

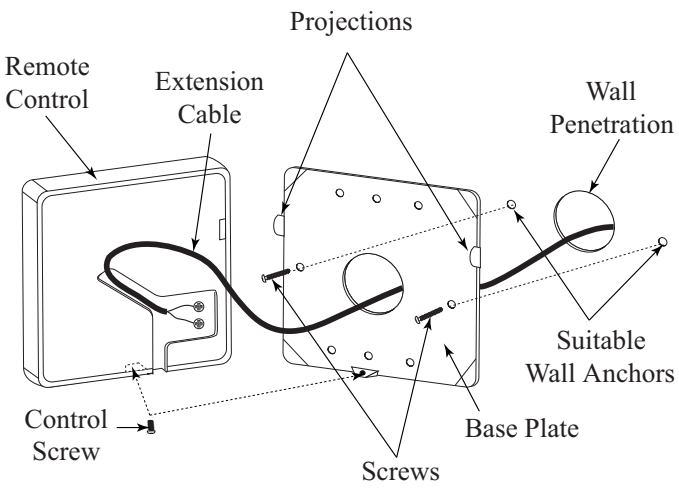
Connecting the remote control to the water heater:

- Ensure that the power to the water heater has been disconnected.
- Loose the 3 screws located on the remote control connection cover made of white plastic (see the diagram on the left top).
- Connect the remote control extension cables from the remote control with the remote control connection terminals (see the diagram on the left bottom).

NOTICE: The remote control wire connection terminals are not polarity sensitive.

- Firmly tighten the terminal screws.
- Secure the remote control extension cable on the hook located on the side of the remote control connection base.
- Tighten the 3 screws and attach the remote control connection cover to the water heater.
- Switch on the power supply to the water heater.
- Ensure proper operation of the remote control and water heater.





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Installing the Main Remote Control:

⚠WARNING: Field wiring connections and electrical grounding must comply with local codes, or in the absence of local codes, with the latest edition of the National Electrical Code, ANSI/NFPA 70, or in Canada, Canadian Electrical Code, CSA C22.1 Part 1.

Electrical Connection

⚠WARNING: Shock hazard line voltage is present. Before servicing the water heater, turn off the electrical power to the water heater at the main disconnect or circuit breaker. Failure to do so could result in severe personal injury or death.

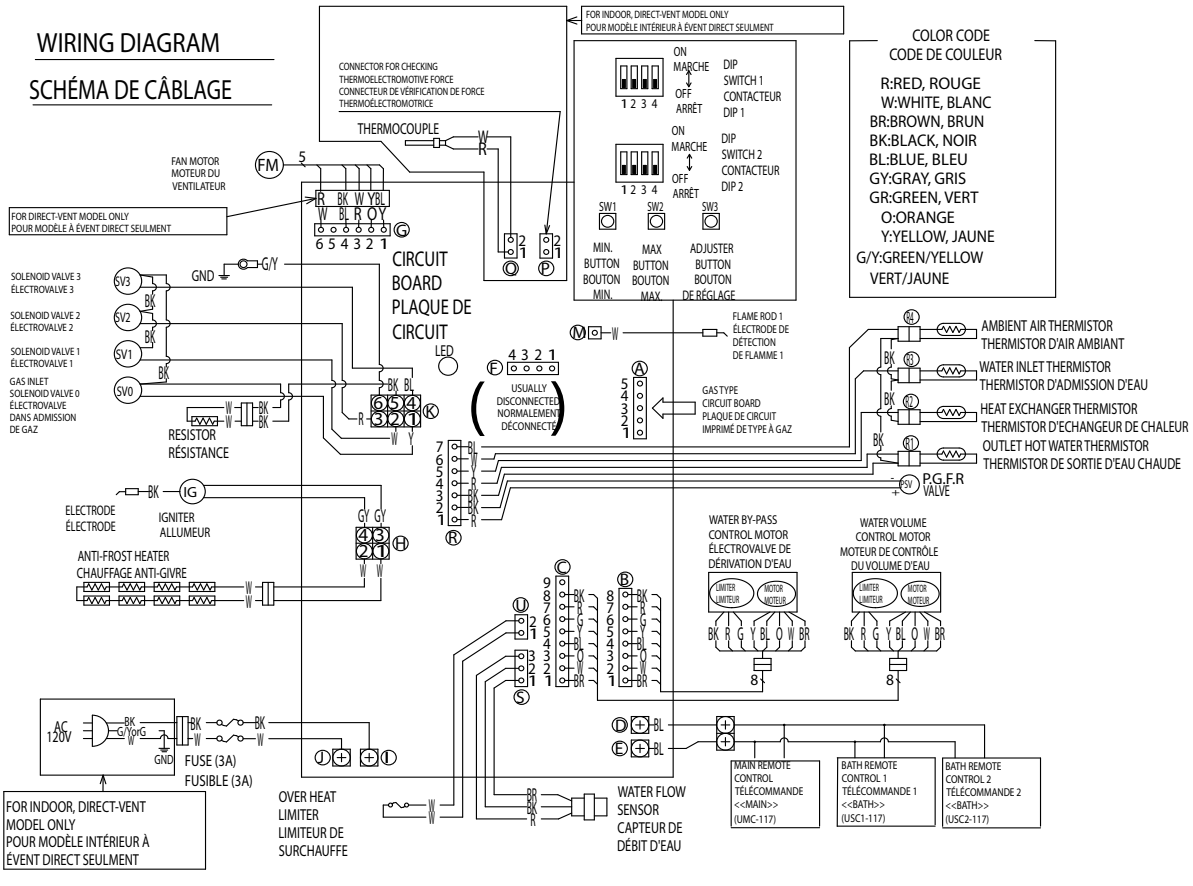
⚠CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify correct operation after servicing.

POWER CORD

- The electric power supply requirement for this water heater is 120 VAC/60HZ, 2 Amps.
- A power supply cord is not supplied with the water heater. Use only a power outlet with a ground terminal.
- The installation of an GFCI (Ground Fault Circuit Interrupter) is recommended.
- Keep any excess of the power supply cord on the outside of the water heater.
- If local codes require hardwiring, see instructions for "Hardwiring the Electrical Connections".

HARDWIRING THE ELECTRICAL CONNECTIONS

- Wiring should be carried out by a qualified electrician in accordance with local codes.
- The water heater requires 120 VAC/60Hz and should be properly grounded.
- DO NOT connect grounding wire to water pipes, gas pipes, telephone cables, lightning conductor circuits and to grounding circuit of other equipment that carry a ground-fault interrupter.
- An ON/OFF switch must be provided and installed for the incoming 120VAC power.
- Wire the water heater exactly as shown below. A wiring diagram is also found inside of the cover panel.
- A green screw is provided in the junction box for a grounding connection.
- Connect the live wire to black leg wire and the neutral wire to the white neutral wire.


WIRING DIAGRAM
SCHÉMA DE CÂBLAGE
FOR INDOOR, DIRECT-VENT MODEL ONLY
POUR MODÈLE INTÉRIEUR À ÉVENT DIRECT SEULMENT
CONNECTOR FOR CHECKING THERMOELECTROMOTIVE FORCE
CONNECTEUR DE VÉRIFICATION DE FORCE THERMOÉLECTROMOTRICE
THERMOCOUPLE
FAN MOTOR
MOTEUR DU VENTILATEUR
FM
FOR DIRECT-VENT MODEL ONLY
POUR MODÈLE À ÉVENT DIRECT SEULMENT
CIRCUIT BOARD
PLAQUE DE CIRCUIT
LED
ON MARCHE
OFF ARRÊT
DIP SWITCH 1 CONTACTEUR DIP 1
DIP SWITCH 2 CONTACTEUR DIP 2
SW1
SW2
SW3
MIN. BUTTON BOUTON MIN.
MAX BUTTON BOUTON MAX.
ADJUSTER BUTTON BOUTON DE RÉGLAGE
COLOR CODE
CODE DE COULEUR
R:RED, ROUGE
W:WHITE, BLANC
BR:BROWN, BRUN
BK:BLACK, NOIR
BL:BLUE, BLEU
GY:GRAY, GRIS
GR:GREEN, VERT
O:ORANGE
Y:YELLOW, JAUNE
G/Y:GREEN/YELLOW
VERT/JAUNE
SOLENOID VALVE 3 ÉLECTROVALVE 3
SOLENOID VALVE 2 ÉLECTROVALVE 2
SOLENOID VALVE 1 ÉLECTROVALVE 1
GAS INLET SOLENOID VALVE 0 ÉLECTROVALVE DANS ADMISSION DE GAZ
RESISTOR RÉSISTANCE
FLAME ROD 1 ÉLECTRODE DE DÉTECTION DE FLAMME 1
USUALLY DISCONNECTED NORMALEMENT DÉCONNECTÉ
GAS TYPE CIRCUIT BOARD PLAQUE DE CIRCUIT IMPRIMÉ DE TYPE À GAZ
AMBIENT AIR THERMISTOR THERMISTOR D'AIR AMBIANT
WATER INLET THERMISTOR THERMISTOR D'ADMISSION D'EAU
HEAT EXCHANGER THERMISTOR THERMISTOR D'ECHANGEUR DE CHALEUR
OUTLET HOT WATER THERMISTOR THERMISTOR DE SORTIE D'EAU CHAUDE
P.G.F.R VALVE
ELECTRODE ÉLECTRODE
IGNITER ALLUMEUR
ANTI-FROST HEATER CHAUFFAGE ANTI-GIVRE
WATER BY-PASS CONTROL MOTOR ÉLECTROVALVE DE DÉRIVATION D'EAU
WATER VOLUME CONTROL MOTOR MOTEUR DE CONTRÔLE DU VOLUME D'EAU
LIMITER LIMITEUR
MOTOR MOTEUR
AC 120V
FUSE (3A) FUSIBLE (3A)
FOR INDOOR, DIRECT-VENT MODEL ONLY POUR MODÈLE INTÉRIEUR À ÉVENT DIRECT SEULMENT
OVER HEAT LIMITER LIMITEUR DE SURCHAUFFE
WATER FLOW SENSOR CAPTEUR DE DÉBIT D'EAU
MAIN REMOTE CONTROL TÉLÉCOMMANDE <<MAIN>> (UMC-117)
BATH REMOTE CONTROL 1 TÉLÉCOMMANDE 1 <<BATH>> (USC1-117)
BATH REMOTE CONTROL 2 TÉLÉCOMMANDE 2 <<BATH>> (USC2-117)

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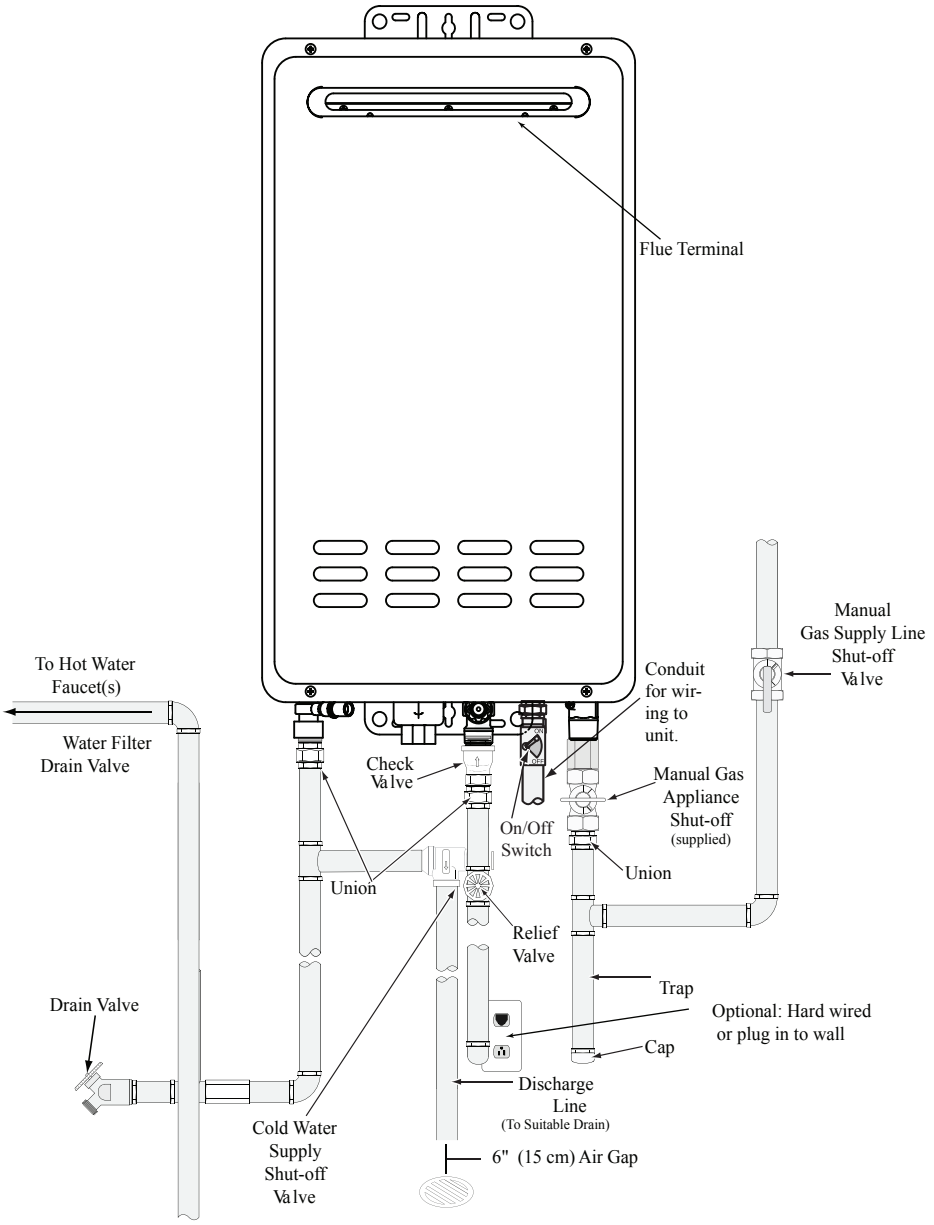
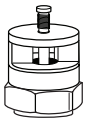
Installing the water heater:

Typical Installation of Water Heater

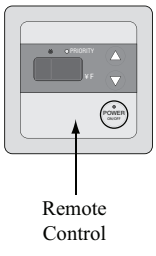


Outdoor Models

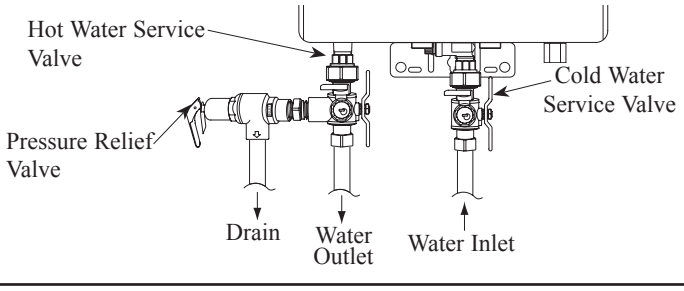
Vacuum Relief Valve (Not Supplied)



If required, install per local codes and valve manufacturer's instructions.



Alternate Water Piping Arrangement with Optional Valve Kit



NOTICE: The National Fuel Gas Code (NFGC) and B149 mandates a manual gas shut-off valve: See NFGC/B149 for complete instructions. Local codes or plumbing authority requirements may vary from the instructions or diagrams provided and take precedent over these instructions.

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Installing the water heater:

Insulation Blankets

⚠WARNING: If local codes require external application of insulation blanket kits the manufacturer's instructions included with the kit must be carefully followed.

Insulation blankets, available to the general public for external use on gas water heaters, are not necessary. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. This water heater does not store water making an insulation blanket unnecessary.

The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property.

The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.

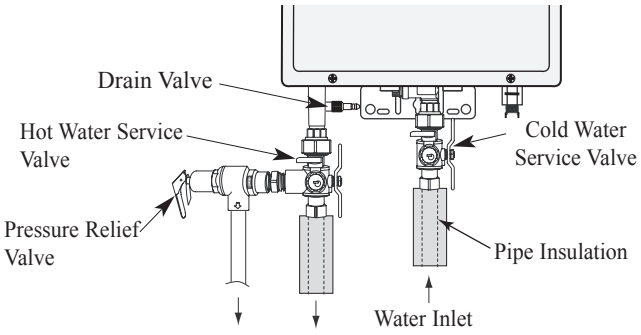
CAUTION: If local codes require the application of an external insulation blanket to this water heater, pay careful attention to the following so as not to restrict the proper function and operation of the water heater:

- Do not cover the air inlet, flue outlet or operating and warning labels attached to the water heater or attempt to relocate them on the exterior of insulation blanket.

Hot and Cold Pipe Insulation Installation

NOTICE: The hot and cold pipes should be insulated as shown to provide additional freeze protection.

⚠WARNING: In case the pipe insulation is not rated for the appropriate weather conditions install electric heat tracing or equivalent to prevent freezing of the pipes. Do not insulate or block drain valve on the hot outlet fitting. If the pipes are allowed to freeze, the water heater and the pipes may malfunction or leak due to freezing water.



For increased energy efficiency, use pipe insulation. Please install the insulation according to the diagram above, making sure to insulate all the way to the top. **Do not** cover any drain or pressure relief valve(s).

During Installation of this water heater…

Do's

- ❑ **Do** follow all installation instructions covered in this manual.
- ❑ **Do** check inlet gas pressure to ensure that it is within the range specified on the rating plate.
- ❑ **Do** provide adequate air for combustion and ventilation as discussed in the Use & Care Manual and the National Fuel Gas Code (CSA B149 in Canada).
- ❑ **Do** maintain proper clearances to combustibles and non-combustibles as specified on the nameplate.
- ❑ **Do** ensure that the venting system complies with the guidelines found in the Use & Care Manual and National Fuel Gas Code (CSA B149 in Canada).
- ❑ **Do** contact local gas company to ensure gas meter and gas piping are adequately sized.
- ❑ **Do** use teflon tape on water line connections and fittings.

Don'ts

- ❑ **Don't** block or restrict Air Intake Opening located on the front cover of the water heater.
- ❑ **Don't** remove the front cover unless absolutely necessary. This should only be done after being examined by a qualified service technician.
- ❑ **Don't** install this product where standing water may occur.
- ❑ **Don't** use pipe dope on water line connections and fittings.

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Installation Check List

A. Outdoor Water Heater Location

- ❑ Outdoor water heaters must be installed outdoors.
- ❑ Protected from freezing temperatures.
- ❑ Proper clearance from combustible surfaces observed
- ❑ Sufficient fresh air supply for proper operation of water heater.
- ❑ Air supply free of corrosive elements and flammable vapors.
- ❑ Provisions made to protect area from water damage.
- ❑ Sufficient room to service heater.
- ❑ Combustible materials, such as clothing, cleaning materials, rags, etc. clear of the heater and vent piping.
- ❑ Water heater is properly attached to the wall.

B. Water Supply

- ❑ Water supply has sufficient pressure.
- ❑ Air purged from water heater and piping.
- ❑ Water connections tight and free of leaks.
- ❑ Water filter is clean and in place.
- ❑ Materials used are as instructed in this manual.
- ❑ Water pipes are insulated and protected from freezing.

C. Gas Supply

- ❑ Gas type matches rating plate.
- ❑ Gas supply pressure is sufficient for the water heater.
- ❑ Gas line equipped with shut-off valve, union and sediment trap.
- ❑ Approved pipe joint compound used.
- ❑ Soap and water solution used to check all connections and fittings for possible gas leak.
- ❑ Gas Company inspected installation (if required).

D. Relief Valve

- ❑ Pressure Relief Valve properly installed and discharge line run to open drain.
- ❑ Discharge line protected from freezing.

E. Electrical Wiring

- ❑ Voltage matches rating plate.
- ❑ Water heater is properly grounded.
- ❑ Supply cord and/or wiring meets all local codes.

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Lighting the water heater:

Before operating this water heater, be sure to read and follow the instructions on the label pictured below and all other labels on the water heater, as well as the warnings printed in this manual. Failure to do so can result in unsafe operation of the water heater, resulting in property damage, personal injury or death. Should you have any problems reading or following the instructions in this manual, STOP, and get help from a qualified person.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING : If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A.This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B.BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

●Do not try to light any appliance. ●Do not touch any electric switch; do not use any phone in your building. ●Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. ●If you cannot reach your gas supplier, call the fire department. ●Do not return to your home until authorized by the gas supplier or fire department.

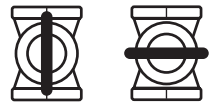
C.Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand,don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D.Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

31-16962(0)

OPERATING INSTRUCTIONS

1.STOP! Read the safety information above on this label.
2.Turn off all electric power to the appliance.
3.Do not attempt to light the burner by hand.
4.Turn the Gas Shutoff Valve located on the outside of the unit clockwise ↷ to the "OFF" position.



5.Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
6.Turn the Gas Shutoff Valve located on the outside of the unit counterclockwise ↶ to the "ON" position.
7.Turn on all electric power to the appliance.
8.If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1.Turn off all electric power to the appliance if service is to be performed.
2.Turn the Gas Shutoff Valve located on the outside of the unit clockwise ↷ to the "OFF" position.

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Operating the water heater:

Safety Precautions

A **Do** turn off manual gas shut-off valve if water heater has been subjected to overheating, fire, flood, physical damage or if the gas supply fails to shut off.

B **Do Not** turn on water heater unless water and gas supplies are fully opened.

C **Do Not** turn on water heater if cold water supply shut-off valve is closed.

D **Do Not** allow combustible materials such as newspaper, rags or mops to accumulate near water heater.

E **Do Not** store or use gasoline or other flammable vapors and liquids, such as adhesives or paint thinner, in vicinity of this or any other appliance. If such flammables must be used, open doors and windows for ventilation, and all gas burning appliances in the vicinity should be shut off including their pilot lights, to avoid vapors lighting.

NOTICE: Flammable vapors can be drawn by air currents from surrounding areas to the water heater.

F If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified person or serviceman perform the work.

⚠DANGER: There is a hot water scald potential if the temperature is settoo high. Households with small children, disabled or elderly persons may require a 120°F (49°C) or lower temperature setting to prevent contact with HOT water.

Water Temperature Setting

The temperature of the water in the water heater can be regulated by setting the temperature on the front of the remote control.

Safety factors should be considered when selecting the water temperature setting of the water heater's remote control.

The remote control was set at 100°F (38°C) before the water heater was shipped from the factory. This is the recommended starting point.

Water temperatures above 125°F (52°C) can cause severe burns or death from scalding.

Be sure to read and follow the warnings outlined in this manual and on the label located on the water heater.

Mixing valves are available for reducing point of use water temperature by mixing hot and cold water in branch water lines. Contact a licensed plumber or the local plumbing authority for further information. (See page 4 for more details.)

The chart below may be used as a guide in determining the proper water temperature for your home.

Time/Temperature Relationship in Scalds

Water Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

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Water Temperature Setting…

Maximum water temperature occurs while the burner is on. To determine the water temperature, turn on a hot water faucet and place a thermometer in the water stream. Water temperature at the faucet may vary depending on season and length of pipe from the water heater.

The factory setting of the remote control temperature range is between 100°F (38°C) and 120°F (49°C).

The remote control is factory preset to 100°F (38°C).

To turn the remote control ON or OFF, press the POWER button.

To adjust the temperature to a required setting, press the UP arrow temperature button.

Pressing the UP or DOWN temperature adjustment buttons will change the temperature set point.

The temperature set point on the remote control cannot be increased above 112°F (44°C) when a hot water faucet is in the open position.

Notice: The remote control cannot be turned on when water is flowing or circulating through the water heater.

Notice: The factory setting allows operating temperatures between 100°F (38°C) and 120°F (49°C). Temperatures of 85°F (29°C) and above 120°F (49°C) can be achieved with the MAIN (UMC-117) remote control. Only qualified service personnel should perform this adjustment. Only factory authorized remote control(s) should be used.

The hottest temperature water will be at the hot water faucet closest to the water heater.

Always remember to test the water temperature with your hand before use and remember that hotter water increases the risk of scald injury.

Always supervise young children or others who are incapacitated.

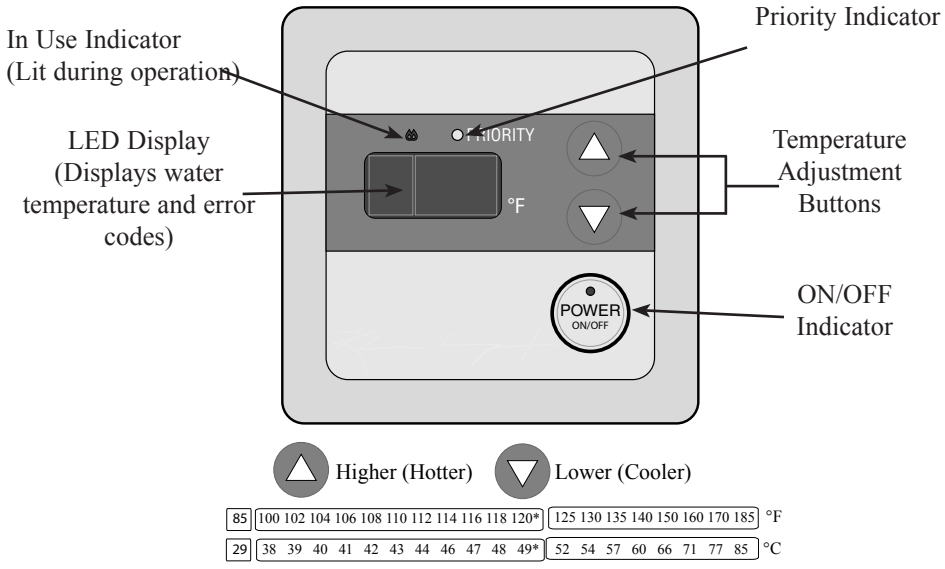
The water heater is equipped with a device that will shut off the gas supply to the burner if the water heater exceeds normal operating temperatures. Refer to the "Before You Call For Service" section located near the back of this manual, or contact your dealer.

⚠WARNING: Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.

If the water heater has been subjected to fire, flood, physical damage, or has been under water, turn off the manual gas shut-off valve(s), and do not operate the water heater again until it has been checked by qualified personnel.

Notice: The water heater may not operate with a small water flow. In such case, increase the water flow. If water heater still does not operate and hot water faucet is completely open, increase the temperature setting on the remote control.

Notice: Display shows °F only.


In Use Indicator
(Lit during operation)
LED Display
(Displays water temperature and error codes)
Priority Indicator
Temperature Adjustment Buttons
ON/OFF Indicator
°F
POWER
ON/OFF
Higher (Hotter)
Lower (Cooler)
85 100 102 104 106 108 110 112 114 116 118 120* 125 130 135 140 150 160 170 185 °F
29 38 39 40 41 42 43 44 46 47 48 49* 52 54 57 60 66 71 77 85 °C

* Temperatures 85°F(29°C) and above 120°F (49°C) can be achieved with the Main (UMC-117) remote control. See page 30 and 31 for minimum and maximum temperature adjustment.

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Care and cleaning of the water heater:

Routine Preventative Maintenance

⚠DANGER: Before manually operating the relief valve, make certain no one will be exposed to the danger of the hot water released by the valve. The water may be hot enough to create a scald hazard. The water should be released into a suitable drain to prevent injury or property damage.

Properly maintained, your water heater will provide years of dependable trouble-free service.

It is recommended that a periodic inspection of the burner, relief valve, air intake filter, water filter and venting system should be made by service personnel qualified in gas appliance repair.

It is suggested that a routine preventive maintenance program be established and followed by the user.

⚠DANGER: Hotter water increases the potential for Hot Water Scalds.

At least once a year, lift and release the lever handle on the pressure relief valve, located in the hot outlet piping of the water heater, to make certain the valve operates freely. Allow several gallons to flush through the discharge line to an open drain.

NOTICE: If the pressure relief valve on the hot water heater discharges periodically, this may be due to a problem in the water system. Contact the water supplier or your plumbing contractor on how to correct this. DO NOT plug the relief valve outlet.

⚠DANGER: Failure to perform the recommended Routine Preventative Maintenance can harm the proper operation of this water heater, which can cause carbon monoxide dangers, excessive hot water temperatures and other potentially hazardous conditions.

Rapid closing of faucets or solenoid valves in automatic water using appliances can cause a banging noise heard in a water pipe. Strategically located risers in the water pipe system or water hammer arresting devices can be used to minimize the problem.

Inspect the area around the water heater to ensure a safe operating environment. Keep appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

Ensure the unit has not been damaged. If damage or denting is present, contact a service personnel to verify proper operation.

Check for any abnormal sounds during normal operation of the water heater.

All piping should be checked for gas and/or water leaks. Refer to page 14 of this manual for instructions on leak testing.

The air intake and cold water supply filters should be cleaned monthly. Refer to the “Housekeeping” section for further information.

DO NOT operate the water heater if you feel something is wrong with the unit.

DO NOT allow children to operate or otherwise handle the unit.

Notice: After inspection, maintenance and/or cleaning, ensure proper operation by turning on a hot water faucet.

Housekeeping

⚠DANGER: Shock Hazard Make sure the electrical power to the water heater is off to avoid potential serious injury or damage to components.

Before performing Housekeeping tasks to this water heater, turn the unit off and disconnect the power supply.

Vacuum around the water heater for dust, dirt and lint on a regular basis.

Clean the water heater and remote control by using a damp soft cloth with a few drops of mild detergent and gently wiping the surfaces of the unit. Wipe any remaining moisture with a dry soft cloth.

⚠DANGER: Combustible materials, such as clothing, cleaning materials or flammable liquids, etc., must not be placed against or next to the water heater.

To ensure sufficient ventilation and combustion air supply, proper clearances must be maintained.

DO NOT block or obstruct the air intake opening of the water heater. A minimum of 12” (30 cm) is required between this combustion air inlet opening and any obstruction.

The Air Intake and Water filters should be cleaned on a monthly basis.

HOW TO CLEAN THE WATER FILTER:

- Make sure the unit is OFF and the electrical power supply has been disconnected.
- Turn the water supply OFF to the heater.
- **Drain heater. See “Draining The Water Heater” section on page 26.**
- Unscrew the water filter, and slide the filter out.
- **DO NOT** tap the filter as it may deform and/or damage the filter.
- To remove severe sediment and dirt, use a soft brush and wash with running water.
- Return the filter to the water heater and screw in the filter.
- Turn the electrical power supply and cold water supply ON to the water heater.

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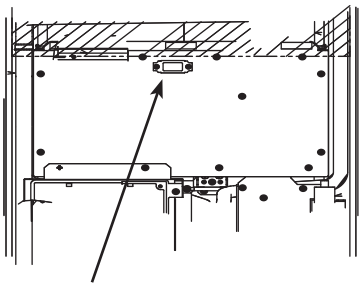
Housekeeping, continued

CLEANING THE WATER HEATER AND REMOTE CONTROL(S):

- Make sure the unit is OFF and the electrical power supply has been disconnected.
- **DO NOT** scrub the appliance with a brush.
- Use only mild soapy water; other cleaners may damage the surface of the water heater.
- **DO NOT** remove any label including the rating plate while cleaning or servicing.
- **DO NOT** splash water on the remote controls when cleaning.



Burner Sight Glass

Burner Inspection

Visually inspect the main burners annually.

Through the front sight glass, inspect the burner flame. Blue flames should be seen when the main burner is firing. See figure on left for location of sight glass.

If any unusual burner operation is noted, the water heater should be shut off until qualified service assistance can be obtained.

⚠**CAUTION: For your safety, burner inspection and cleaning should be performed only by qualified service personnel.**

For cleaning, a vacuum cleaner can be used on the burner.

Vacation and Extended Shut-Down

NOTICE: Refer to the Freeze Protection Section on page 26.

If the water heater is to remain idle for an extended period of time, the power and water to the appliance should be turned off.

The water heater and piping should be drained if they might be subjected to freezing temperatures.

After a long shut-down period, the water heater's operation and controls should be checked by qualified service personnel.

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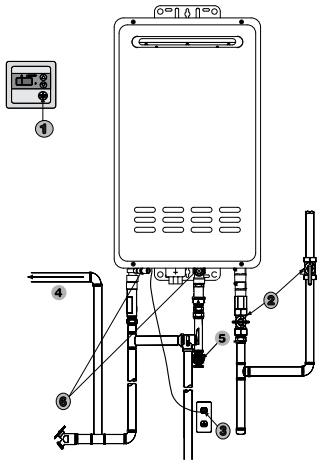
Care and cleaning of the water heater:



Draining the water heater

⚠WARNING: Failure to follow these instructions while draining the water heater can cause serious damage to the water heater as well as personal injury, including scalding.

⚠CAUTION:Even when drained properly, a small amount of water will remain in the water heater. In cold weather, conditions this water can freeze. If this happens allow the defrost protection on the heater at least 30 minutes to melt the frozen water or the water heater may not work properly.

Draining the Water Heater

Below are instructions for draining water out of the water heater.

1. Turn off the switch on the remote control.
2. Close the gas shut-off valve(s).
3. Unplug the power supply cord (or disconnect breaker) at least 10 seconds after step #1.
4. Open all hot water faucets. Before proceeding to the next step, make sure that COLD water is coming out of all hot water faucets.
5. Close the water shut-off valve.
6. Using a suitable container to catch water, remove the water filter and the drain valve from heater. Attach a garden hose to the drain valve installed in the hot water outlet line and direct the stream of water to a suitable drain where it will cause no damage. Leave water heater as is until next use.

To put the water heater back into operation after draining, follow the steps below.

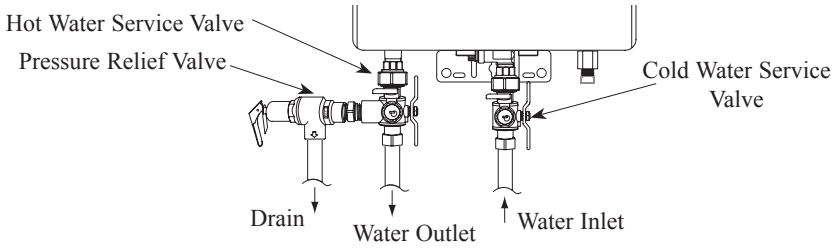
1. Reinstall the drain valve and the water filter. Close the hot water outlet drain valve.
2. Open the water shut-off valve and close again after making sure that water comes out from hot water faucets. (This step is to remove air from the water lines.)
3. Plug into an electrical outlet, fully open the gas shut-off valve and the water shut-off valve.

NOTICE: The water heater may not operate unless the above procedure is followed correctly.

Optional Maintenance Method

Isolator valve kits may be purchased as optional items from manufacturer, distributor or place of purchase. They allow for one person full diagnostic testing and ease of flushing the system.

The kit includes two full port isolation valves, one for the cold side and one for the hot side.



Freeze Protection

⚠WARNING: Failure to drain the water heater can cause serious damage to the water heater as well as personal injury.

NOTICE: DO NOT unplug the electric power supply cord for freeze protection.

Where the water heater may be exposed to freezing conditions, even for a short period of time, be sure to drain all water from the unit as instructed above.

Exposure to freezing conditions can occur from down draft of venting system or from installation in areas exposed to cold air.

The water heater is equipped with a Freeze Protection Electric Heater. As long as electricity is supplied to the water heater, it prevents freezing inside the water heater down to an ambient temperature of approximately minus 30°F (-34°C) (without wind conditions).

This device only protects the internal components of the water heater. It does NOT protect piping and valves. Therefore, piping and valves should be wrapped with insulation material as instructed on page 19.

Another method of freeze prevention is by running a small volume of water. Running water will protect the water heater, piping and valves.

Follow the steps below to ensure proper water flow through the water heater and piping:

1. Turn off the switch on the remote control.
2. Close the gas shut-off valve.
3. Open the hot water faucet slightly until a stream of approximately 1/8” (.32 cm) is flowing. Be sure to check the flow periodically.

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Before You Call For Service…

Troubleshooting Tips
Save time and money! Review the charts on the following pages first and you may not need to call for service.

Problem	Possible Cause	What To Do
Not enough or no hot water.	Water Shutoff valve is not fully opened.	● Check shutoff valve and open fully.
	Hot water faucet is not fully opened.	● Open hot water faucet completely. (The main burner goes off when incoming water volume is inadequate.)
	Water piping is frozen.	● Allow piping to thaw.
	No electricity or water supply is cut off.	● Check that proper power is being supplied and/or water supply is adequate.
	Unit is not “ON”.	● Turn the unit “ON” by the button on the remote control.
	The temperature may be set too low.	● Increase the temperature setting.
	Mixing Valve Malfunctions (if applicable)	● Check and replace if necessary.
	Error code displayed on remote control.	● See instructions for Error Code and if required, contact a dealer for service.
	Not enough water demand.	● Increase water flow.
	Water inlet filter clogged.	● Clean water inlet filter.
	Fixture aerator is clogged.	● Clean aerator.
	Scale buildup in heat exchanger.	● Check for error code. If required, contact a dealer for service.
	Hot and cold water lines reversed.	● Reverse water connections.
Water not hot enough.	The temperature may be set too low.	● Increase the temperature setting.
	The gas valve is not fully opened.	● Check and open the gas valve fully.
	Gas supply pressure is low.	● Call your gas company to verify the gas meter and gas piping size.
	Bleed over in one of the hot water fixtures.	● Call dealer for service.
Water too hot.	Temperature is set too high.	● Decrease the temperature setting.
	Water shutoff valve is not fully opened.	● Check shutoff valve and open fully.
	Small amount of water has been heated.	● Allow more water to flow.
Fan continues to rotate after hot water faucet is closed.	This function is to supply hot water when the hot water faucet is reopened.	● Normal operation. There is no need to call for service.

⚠CAUTION: Make certain power to water heater is “OFF” before removing protective cover FOR ANY REASON.

⚠CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. VERIFY PROPER OPERATION AFTER SERVICING.

⚠CAUTION: For your safety, DO NOT attempt repair of electrical wiring, gas piping, remote control, burners, vent connectors or other safety devices. Refer repairs to qualified service personnel.

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Error Code Guide:

When an error code is displayed:

- Close the hot water faucet, turn off the switch on the remote control.
- Wait for about 5 minutes before turning the switch on again.
- Open the hot water faucet.

If the error code remains in the display:

- Close the hot water faucet and turn off the switch on the remote control.
- Take the proper action shown below and attempt operation of the appliance again.

If the error code is still shown:

- Turn off the hot water faucet and turn off the switch on the remote control.
- Take note of the error code displayed and call the customer service assistance number in the "If You Need Service" section of the manual on the back cover.

Notice: If an error code other than those listed below is displayed, immediately turn off the hot water faucet, take note of the error code, turn off the switch on the remote control and call the customer assistance number.

Error Code	Possible Cause	What To Do
11 or 12	The Gas shutoff valve is not opened fully. Gas service has been interrupted. LP Gas is running low. (LP models only). Air in Gas Line. Power supply not grounded. Low inlet gas pressure due to improper sizing Wrong gas type.	● Open the Gas shutoff valve fully. ● Contact gas utility company. ● Fill up LP Gas container or replace with a new cylinder of LP Gas. ● Bleed all air from gas lines. ● Ensure appliance is properly grounded. ● Ensure gas line, meter, and regulator are sized properly. ● Ensure gas type is correct. ● Ensure venting is per Use & Care Manual. Contact a dealer for service.
15	The hot water faucet is not opened enough. Water heater has build up of lime deposits.	● Open the faucet more to secure enough volume. ● Contact a dealer for service.
1L 99 **Outdoor Water Heater Only**	Water heater has buildup of lime deposits. Decrease of blower motor ventilation volume. (Operation Stops)	● Contact a dealer for service. ● Clean any blockage from heat exchanger fins and/or blower motor

⚠CAUTION: Make certain power to water heater is "OFF" before removing protective cover FOR ANY REASON.

⚠CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. VERIFY PROPER OPERATION AFTER SERVICING.

⚠CAUTION: For your safety, DO NOT attempt repair of gas piping, remote control, burners, vent connectors or other safety devices. Refer repairs to qualified service personnel.

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Replacement Parts:

Outdoor Water Heater

⚠WARNING: For your safety, DO NOT attempt to disassemble this unit for any reason.

Instructions For Placing a Parts Order

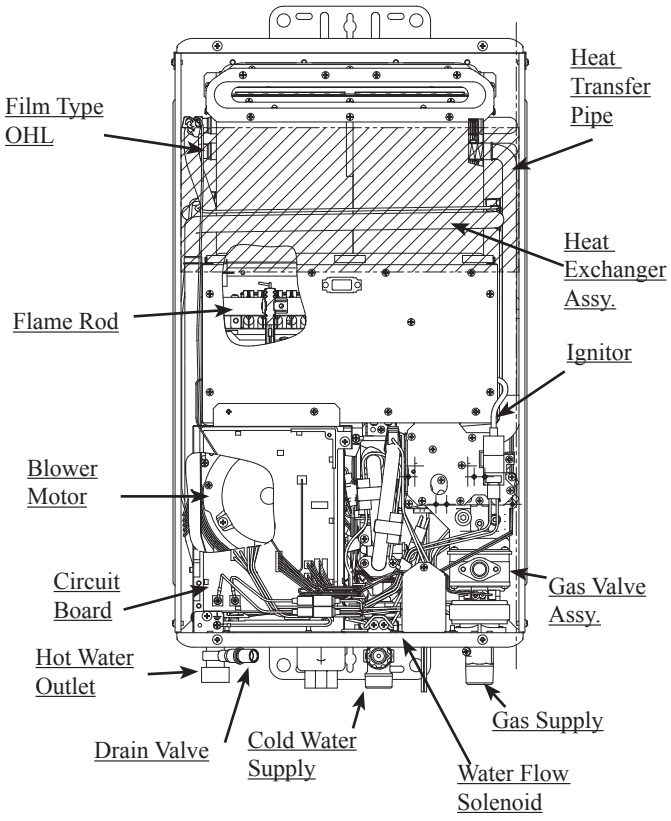
Address parts orders to the distributor or store where the water heater was purchased.

All parts orders should include:

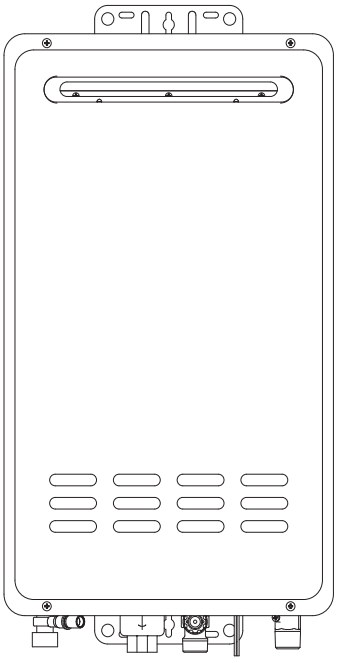
1. The model and serial number of the water heater from the rating plate.
2. Specify type of gas (natural or LP) as marked on the rating plate.
3. Part description (as noted below) and number of parts desired.

⚠CAUTION: For your safety, DO NOT attempt repair of electrical wiring, gas piping, burners, vent connectors or other safety devices. Refer repairs to qualified service personnel.

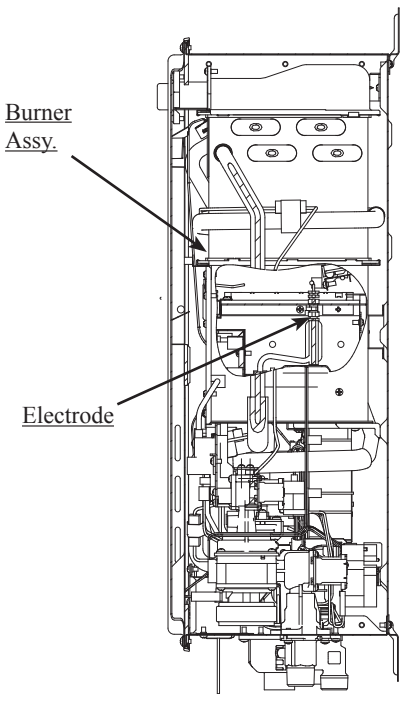
Front View



Unit Cover Panel



Side View



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The content on this page is intended for use by qualified installation/service personnel ONLY.

⚠WARNING: Improper adjustment, alteration, service or maintenance can cause property damage, personal injury, or death.

Maximum Temperature Adjustment by the Main Remote Control (UMC-117)

Required adjustment for up to 140°F (60°C) water temperature settings for Residential product or 185° (85° C).

⚠WARNING: Refer to scald potential warnings on page 4 before making adjustment. Changing this setting is done at your own risk.

DO NOT execute the following adjustment if the setting of up to 140°F (60°C) or 185° (85° C) is not required.

Follow the instructions below if it is determined that a setting of up to 140°F (60°C) or 185° (85° C) is required.

- **Turn on the remote control. Turn off the gas and water shutoff valves.**
- **Press the UP arrow temperature adjustment button on the remote control for several times and set the temperature at 120°F (49°C).**
- **Press and hold the UP button on remote control for more than 5 seconds. Number (120) on the display of the remote control will begin to blink.**
- **While the number is blinking, push the UP arrow temperature adjustment button and the Down arrow temperature adjustment button at the same time. The display of the remote control will show "140".**
- **Push the UP or Down button to set desired temperature.**
- **Turn on the gas and water shut off valves.**
- **Check and ensure safe operation and performance of the water heater.**

⚠DANGER: Hotter water increases the potential for Hot Water SCALDS.

Time/Temperature Relationship in Scalds

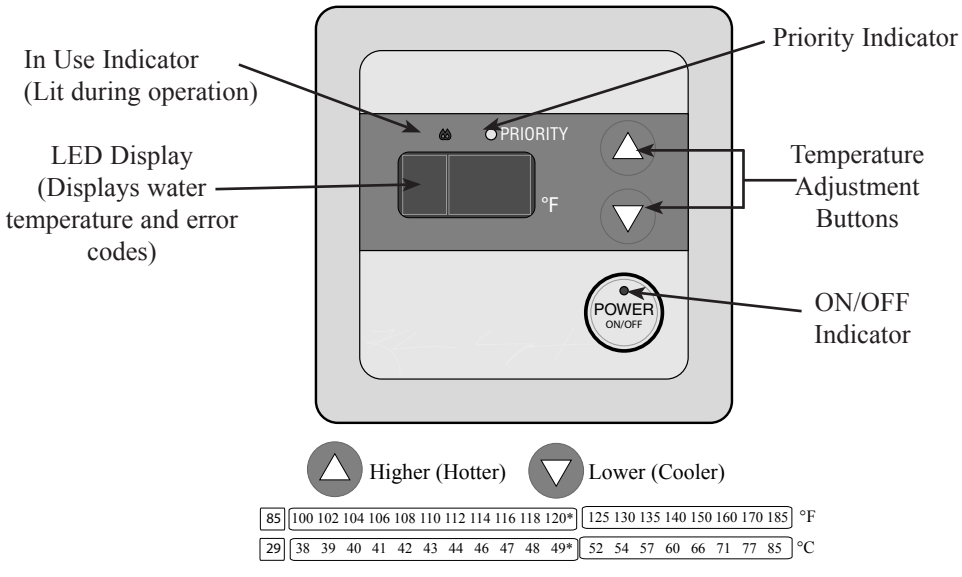
Water Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1-1/2 to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1-1/2 seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

See steps below to LIMIT maximum water temperature setting to 120°F (49°C).

- **Turn on the remote control. Turn off the gas and water shutoff valves.**
- **Press the Down arrow temperature adjustment button on the remote control for several times and set the minimum setting temperature (100°F(38°F) or 85°F(29°F)).**
- **Press and hold the Down button on the remote control for more than 5 seconds. Number on the display of the remote control will begin to blink.**
- **While the number is blinking, push the Down arrow temperature adjustment button and the UP arrow temperature adjustment button at the same time. Number of the display of the remote control will stop blinking.**
- **Push the UP or Down button to set desired temperature.**
- **Turn on the gas and water shut off valves.**
- **Check and ensure safe operation and performance of the water heater.**

Notice: Display shows °F only.


In Use Indicator
(Lit during operation)
LED Display
(Displays water temperature and error codes)
Priority Indicator
PRIORITY
°F
Temperature Adjustment Buttons
POWER
ON/OFF
ON/OFF Indicator
Higher (Hotter)
Lower (Cooler)
85 100 102 104 106 108 110 112 114 116 118 120* 125 130 135 140 150 160 170 185 °F
29 38 39 40 41 42 43 44 46 47 48 49* 52 54 57 60 66 71 77 85 °C

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⚠WARNING: Improper adjustment, alteration, service or maintenance can cause property damage, personal injury, or death.

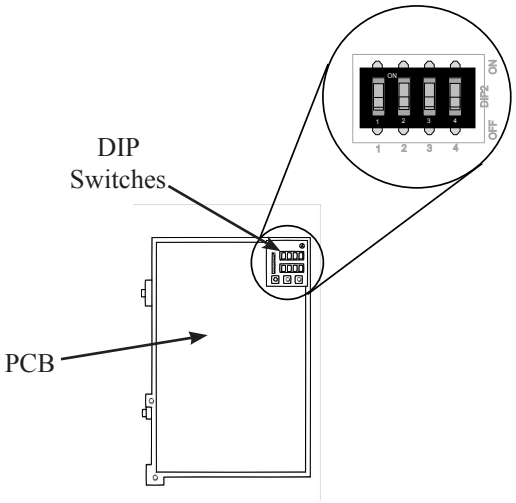
Minimum Temperature Adjustment by the Main Remote Control (UMC-117, USC1-117 and USC2-117)

Required adjustment for 85°F (29°C) water temperature setting.

Follow the instruction below if it is determined that a setting of 85°F (29°C) is required.

- Turn on the remote control. Turn off the gas and water shutoff valves.
- Press the Down arrow temperature adjustment button on the remote control for several times and set the temperature at 100°F (38°C).
- Press the Down button on remote control 3 times within 5 seconds. The display of the remote control will show “85”.
- Turn on the gas and water shut off valves.
- Check and ensure safe operation and performance of the water heater.

NOTICE: The maximum flow rate at 85°F (29°C) is 1.3 gpm (5.0 l/m).



Location of DIP Switches on PC Board.

High Altitude DIP Switch Adjustment For High Altitude Installation above 3,280 Feet (1,000m)-

NATURAL GAS MODELS ONLY

When the water heater is installed above 3,280 feet (1,000m), the adjustment of DIP switch is required for high altitude installation.
Without adjusting the DIP switch, the water heater may not function properly.

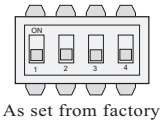
NOTICE: If the water heater is installed less than 3,280 feet (1,000m), no action is required.

How to adjust the DIP switch on the PCB for high altitude installation:

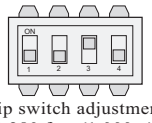
- Check the altitude (above sea level) where the water heater is installed.
- If the altitude is more than 3,280 feet (1,000m), the adjustment of DIP switch is required.
- Turn off the gas shut off valve and water shutoff valve.
- Remove the front cover.
- Find the two DIP switches located at the top right hand side of the PCB. The switch labeled "DIP 2" is the bottom switch.
- Change the DIP switch #3 setting of DIP 2 to “ON” position if the water heater is installed above 3,280 feet (1,000m) below 6,560 feet (2,000m). See the diagram below. DO NOT alter any other DIP Switch.
- Change the DIP switch #4 setting of DIP 2 to “ON” position if the water heater is installed above 6,560 feet (2,000m) below 9,840 feet (3,000m). See the diagram below. DO NOT alter any other DIP Switch.

NOTICE: Manifold pressure will be reduced by this adjustement.

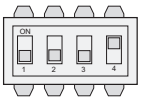
- Attach the unit’s front cover.
- Turn on the gas shutoff valve and water shutoff valve.
- Check and ensure safe operation and performance of the water heater.



As set from factory



Dip switch adjustment
3,280 feet (1,000m)
thru
6,560 feet (2,000m)



Dip switch adjustment
6,560 feet (2,000m)
thru
9,840 feet (3,000m)

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IF YOU NEED SERVICE

1. Should you have any questions about your new water heater, or if it requires adjustment, repair, or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event the firm has moved, or is unavailable, refer to the telephone directory, commercial listings or local utility for qualified service assistance.

2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's National Service Department at the following address:

   2600 Gunter Park Drive
   Montgomery, Alabama 36109-1413
   Phone: 1-800-432-8373.

   When contacting the manufacturer, the following information will be requested:

a. Model and serial number of the water heater as shown on the rating plate attached to the front panel of the heater.
b. Address where the water heater is located and physical location.
c. Name and address of installer and any service agency who performed service on the water heater.
d. Date of original installation and dates any service work was performed.
e. Details of the problem as you can best describe them.
f. List of people, with dates, who have been contacted regarding your problem.

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